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Feline Enteritis and Feline Distemper

A Survey of the Literature

by

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The infectious diseases of the cat have received attention at varying intervals but despite large amounts of clinical data relatively little work has been carried out with regard to aetiology, epizootiology, prophylaxis and the pathology of the various conditions. Workers in various parts of the world have studied some of these infectious diseases but the general picture resulting is rather confusing and a study of the literature relating to diseases of the cat reveals large gaps in our knowledge.

The clinicians appear to recognize at least two infectious diseases of the cat (Kirk, 1925 and Gray, 1935) which, in the main, are characterized by two definite syndromes, either an alimentary or a thoracic type of disease. There is, of course, much overlapping and some practitioners consider there are as many as four distinct types, *e.g.*, Smythe (1934) recognized four distinct contagious diseases: infectious enteritis, contagious ulcerative glossitis, cat influenza and cat distemper. Uvarov (1946) classified the infectious diseases of the cat into nine separate groups, seven of these being either of the alimentary or thoracic type which were previously classified very broadly as feline distemper.

Records of one type of infectious disease of cats have been traced back by some workers to the 15th century when an epidemic occurred in Germany. Hutyra & Marek (1938) record an "*enteritis pseudo-membranacea*" of cats with a seasonal incidence and symptoms of vomiting followed by rapid death. The changes found on *post-mortem* examination, as described by them, are relatively severe and include necrosis of the intestinal mucosa and extravasation of blood into the intestinal lumen. Zschokte (1900) described this disease and regarded it as being due to a virulent type of ***B. coli.***

The first step forward in the understanding of the aetiology of these conditions was made by Verge & Cristoforoni (1928), who showed that an infectious disease called by them "infectious gastro-enteritis of cats" was due to a filtrable virus. These workers reproduced the disease artificially and their work indicated that immunity to the virus could be obtained. Later Urbain *et al.* confirmed that gastro-enteritis was due to a virus which was found to be present principally in blood and spleen and was excreted in the saliva, urine and faeces. These workers prepared a formolized vaccine from the spleen of animals affected with the disease and showed that this vaccine would confer immunity on kittens exposed to the disease.

Hindle & Findlay (1932) investigated the disease known as feline distemper which clinically appeared in a variety of forms. The symptoms were so general and inconstant that the authors stated they offered no reliable means of diagnosis. A constant feature was, however, some degree of congestion of the small intestine. They proved that the disease was due to a filtrable virus, that it could be transmitted by fomites and that the large number of bacteria present play the part of secondary invaders. The bacteria isolated were mainly coliform organisms but salmonellae, streptococci and pasteurellae were also found. Eight per cent. of their cases were bacteriologically sterile. Hindle & Findlay also showed that the virus was capable of being preserved in 50 per cent. glycerine and could be attenuated or killed by drying at room temperature. They stated that the dried virus was antigenic and that an immune serum could be produced which would provide temporary protection for kittens. They were unable to infect the common laboratory animals with the virus. Urbain (1933) gave details of some of the properties of the virus of feline gastro-enteritis.

Jarmai (1934) described a gastro-enteritis in cats due to a filtrable virus, in which the only lesion was an inflammation of the small intestine. Lombard (1934) described an infectious disease which in addition to a characteristic temperature reaction revealed a large variety of symptoms. *Post-mortem* changes included an enteritis which varied from a slight to a croupous inflammation. Degenerative changes were also noted in other organs. A virus was isolated and found to be capable of transmitting the disease. Lombard isolated many bacteria but these were regarded as secondary invaders. He was unable to infect the common laboratory animals. The virus could be preserved in 50 per cent. glycerine and a formolized vaccine was prepared. This vaccine and a combination of virus and serum gave very satisfactory results. He noted that many cats over six months were immune to artificial infection and regarded this as being due to an acquired immunity after natural infection.

Bisbocci (1935) examined 35 cats which had died from gastro-enteritis. The symptoms described were anorexia, vomiting, diarrhoea, pain on palpation of the abdomen and pyrexia. *Post-mortem* examination revealed extensive lesions in various parts of the body, chiefly gastro-enteritis, but there were also present broncho-pneumonia, nephritis, meningitis and general epithelioid cell proliferation throughout the body. The author considered that most of these changes were due to secondary invaders. In every case he isolated a coliform organism.

In England, Dalling (1935) divided the feline infectious diseases broadly into a thoracic and an abdominal form of distemper. In the gastro-intestinal type there was a rise in temperature following inoculation but no other specific symptoms. The disease was reproduced by bacteria-free filtrates and Dalling regarded the bacteria which were isolated as secondary invaders. Streptococci and salmonellae were often isolated from cases which had pneumonia and these changes Dalling regarded as secondary to the enteritis. Recovered cats were immune. The chief lesion was the enteritis, varying from a mild congestion to an actual necrosis of the mucous membrane. This worker showed that the respiratory tract was one possible portal of entry of the virus into the body. He described a respiratory type of disease, with symptoms of sneezing, nasal and ocular discharge and, occasionally, involvement of the throat and mouth. This disease was shown to be immunologically distinct from the enteritic disease.

From a study of the literature up to this point, it may be concluded that there are at least two highly infectious conditions of the cat localizing mainly in the abdominal and thoracic cavities, one at least of virus origin and both complicated by the action of numerous secondary invaders, thus giving rise to the variety of symptoms and the variations in the *post-mortem* lesions. The picture, generally, is not unlike the varied manifestations of canine distemper. However, some years later, three almost identical descriptions of a feline disease were published. Kikuth *et al.* (1943), recorded an acutely infectious disease amongst laboratory cats in Germany. The constant *post-mortem* findings were inflammation of the small intestine and hypoplasia of the haemopoietic system. The marked clinical feature was the progressive drop in the leucocyte count from about 15,000 per c.mm. to below 1,000 per c.mm. In addition, acidophilic inclusion bodies were demonstrated in some cells, mainly in the cells of the intestine and spleen, the bone marrow and lymph follicles. Attempts to isolate a virus and to transmit the disease to laboratory animals were inconclusive. In America, Hammon & Enders (1939) and Syverton *et al.* (1943), described a closely related if not identical disease. Here again the striking features were those of a panleucopaenia. The lesions appeared to be confined to the intestinal tract, the corresponding lymph nodes and the bone marrow. The authors independently established that this was a virus infection and demonstrated the presence of intranuclear acidophilic inclusion bodies. They were unable to infect either the common laboratory animals or the developing chick embryo. Hammon & Enders noted some slight variation in the symptoms and lesions but regarded these as being mainly due to secondary invaders. They regarded the disease as a "fulminating panleucopaenia" and thought that this symptom had its origin in a failure of leucopoiesis. Syverton *et al.*, though agreeing in the main with Hammon, differed somewhat in their interpretation of the blood changes and named the condition infectious feline agranulocytosis. They noted a profound neutropaenia and a marked relative lymphocytosis. The symptoms given by the two authors and those of the German workers agree closely with those described in cases of feline enteritis described earlier, but in none of the previous references

could any mention be found of blood changes. Hindle & Findlay, in fact, stated that they had noticed no characteristic blood changes except for a slight monocytosis which they regarded as insignificant. Syverton *et al.* described the property of the virus and stated it was present in the blood, faeces, urine and nasal secretions. Lawrence, working with Syverton, points out that though infectious enteritis has a clinical course very similar to infectious agranulocytosis and that both are due to a virus, the fact that, at that time, there was marked variation in the blood picture showed that the diseases could not be regarded as identical.

Baker, J. (1944) described a disease he referred to as cat distemper, in which a virus was isolated, and shown to be responsible. The properties of this virus differentiated it from that of infectious agranulocytosis. This disease was essentially of the respiratory type and the symptoms were those associated with pneumonia. There was involvement of the eyes with lachrymation and conjunctivitis. Elementary bodies were noted in the monocytes. The virus was present in the ocular and nasal discharges and in the lungs. It was capable of transmission to mice and rabbits, guinea-pigs and hamsters and to embryonated eggs.

Discussion

From the literature it would appear that there are three fairly well-defined enzootic diseases of the cat, these being feline enteritis, feline agranulocytosis and feline pneumonia.

The symptoms noted in the infectious diseases in question are very variable and are stated to be of little value in a differential diagnosis. A few main features, however, may be noted. In feline agranulocytosis the most marked distinguishing feature is, of course, the characteristic blood picture, associated with the fulminating panleucopaenia. The symptoms in feline enteritis are vague and unsatisfactory as a means of diagnosis. Generally there is a sudden onset, pyrexia, inappetence and a profound depression. Vomiting and diarrhoea may occur. These symptoms may be noted, too, in infectious agranulocytosis. In the influenza-pneumonia syndrome, however, one notes especially the symptoms associated with disease of the respiratory tract, *viz.*, sneezing, lachrymation, rhinitis, some early pyrexia, bronchitis and pneumonia. The age of the affected animal and the severity of one main type of symptom may be some guide in diagnosis. With regard to the age incidence, enteritis appears particularly to affect young animals. The influenza-pneumonia appears to affect cats of all ages. There is, however, a great deal of overlapping and no clear-cut distinction is possible on clinical grounds.

Pathologically one appears to be on firmer ground. Infectious agranulocytosis gives rise to fairly well-defined lesions, mainly in the intestinal tract, the adjacent lymph nodes and the bone marrow. The findings microscopically, chiefly the presence of inclusion bodies and the aplastic appearance of the bone marrow, together with the blood picture are diagnostic. The findings in feline enteritis, as the name suggests, are confined to the intestine; they are chiefly localized to the small intestine and comprise changes varying from a slight congestion to necrosis and even ulceration of the mucous membrane. Very occasionally blood has been noted in the lumen of the bowel. The adjacent lymph glands may show evidence of congestion and there may be slight enlargement of the spleen. These more advanced changes may occasionally be seen in agranulocytosis cases and there can be no doubt that these more severe reactions are due to secondary invaders. One rarely notes references to changes elsewhere. In the pneumonia type of infection, there is consolidation of the lungs, which are a pinkish grey colour, and some laryngo-tracheo-bronchitis. Pharyngeal and oculo-nasal lesions are noted. A feature of the disease, microscopically, was the presence of elementary bodies in the monocytes. These are said to stain well with Giemsa stain.

All observers of these feline enzootics stress the infectivity of the diseases; indeed, many of the workers had difficulty in maintaining healthy experimental non-immune stock. It has been shown that the causal agent may be present in most of the excretions and secretions of infected animals. The virus of feline agranulocytosis has been proved to be present in the faeces, urine and nasal secretions of infected cats. Baker stated that the virus responsible for cat pneumonia was present in the ocular and nasal discharges. The virus of feline enteritis has been shown to be present in the faeces, urine and saliva. Ingestion and inhalation have been proved to be two possible means of entry of the infection into the animal tissues; experimentally a variety of routes have been used to infect animals. Having this in mind the possibility of an insect vector cannot be overlooked since Syverton showed that the cutaneous inoculation of virus was capable of setting up the disease. That fomites, especially blankets, rugs, etc., play an important part in the spread of these diseases is nowhere disputed. The collecting together of groups of young susceptible cats as at shows and catteries provides an excellent opportunity for the dissemination of the diseases. Contact, direct or indirect, plays an important part in disease spread. The possibility of adult immune stock acting as carriers cannot be overlooked. In addition, the spread of the vague catarrhal types of disease due to the many bacteria usually associated with these diseases must be borne in mind. Factors which will reduce the animal's vitality and resistance, such as train journeys to and from shows, changes in temperature, will all play a part in the epizootiology.

Prophylaxis appears to hold out some promise for the future. Many workers, notably Urbain, Dalling and Findlay, have shown that formolized vaccines and hyperimmune sera can be produced, but their application to practice still requires some consideration since the resulting immunity does not appear to be of long duration. Dalling showed that the immunity conferred by the use of formolized vaccine was of short duration and better results were obtained with vaccine followed by virus. Leasure *et al.* showed that the use of hyperimmune serum and virus given simultaneously resulted in a good degree of immunity. Gochenour (1943) recommended two inoculations with a formolized tissue vaccine for protection, and in cases which have been exposed to infection, the use of serum followed later by vaccine. The possibility of using vaccines against the many secondary invaders should be investigated.

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International Veterinary Co-operation—A Necessity

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The editorial, "International Co-operation," published in *The Veterinary Record* of December 21st, 1946, a similar article of Dr. Homan's in the *Schweiz. Archiv. f. Tierheilkunde*, No 4, 1946 and *Yugoslave Cas Ces Vet.*, No. 11, 1946, are calling for international co-operation and an international congress. This idea is praiseworthy but what remains to be done is to put it into speedy action.

Many European countries have been devastated and their public services disorganized. Livestock has been decimated by war, diseases and merciless exploitation by the aggressor. Well-established veterinary colleges, and State, as well as Municipal Services, have been erased or so disorganized as to make a completely new start essential.

When ruthless destruction had ceased, and in many countries even before the last shot had been fired, the task of rebuilding began. Only one year had passed when Colleges already had opened their doors to admit young people who had been unable to continue their curricula during the past six years, or who had been prevented from starting their studies. The need for professional men is great and therefore a speedy output is an urgent necessity. This explains why teaching is going on in many instances still in the most distressing conditions. The needs of both teachers and students are enormous, as there are neither adequate books nor instruments, chemicals and other necessaries, making teaching and professional work not only a difficult task but a serious problem. The will to rebuild is, however, strong enough to surmount all such obstacles, and restoration has made visible progress, especially since U.N.R.R.A. lent a helping hand.

The author of the Editorial calls for "the closest co-operation between the different State veterinary services." This is indeed a very important point and has been the basic idea of the Office International des Epizooties. Does the writer of the Editorial's term—"State Veterinary Service"—include the Inspection and Hygiene of Food of Animal Origin besides Epizootiology? The State Veterinary Service of most continental countries is composed of the above two branches, both being under the control of one

department attached to the Ministry of Agriculture, or else they are organized as follows: State Veterinary Service proper (epizootiology) attached to the Ministry of Agriculture, and Hygiene of Food of Animal Origin under the Ministry of Public Health. If the food branch does not receive proper attention and representation, the new, or shall I say revived, International Organization will be a failure from the very start. What was satisfactory before 1939, when Europe and the rest of the world had everything in abundance, especially food, is not adequate and satisfactory to-day. The trade in livestock is only a passing feature until the urgent requirements for breeding stock have been satisfied; then processed food will once again predominate the international market. Would it not, therefore, be advantageous to consider closer collaboration with the F.A.O. whose aim is to provide the world with good and healthy food? Sir J. Boyd Orr said at the recent N.V.M.A. Congress: "This Food and Agricultural Organization of the United Nations is set up for a specific purpose to ensure that all people will have food on a health standard . . . the most important thing is to increase the production of animal foods. When we go into that, we find that the big obstacle is disease in animals and we have decided that we must set up a special committee of veterinarians to consider what should be done in all countries of the world." This statement requires no further comment. As animal diseases have to be controlled and fought before and after slaughter, it is often not enough to emphasize that both the epizootiologist and meat hygienist must participate in such work. During the past 20 years, food of animal origin has occupied a very important part in the veterinarian's duties on the Continent (more than a quarter of the total number of veterinary surgeons are employed in this branch). Chairs of Hygiene of Meat and Food of Animal Origin, so splendidly inaugurated by Professor Ostertag, have been founded in every College and the Services centralized, as I have already mentioned. I would go even further and say that if the international organization is to serve its purpose, all veterinary specialities should be represented on the board, as it is impossible to be *au fait* with all aspects of the profession.

On the Continent, it was a real problem, before the war, to deal with the export of animal products. A pig's carcase had to be given a different examination for shipment to Britain, to Germany and to Austria. For example, I have in front of me three different meat inspection laws—German, Polish and Russian. As compared with the British law, they differ quite extensively, but there also exist differences between those three laws themselves. As one example I shall cite the question of dealing with foot-and-mouth disease, in which the three former meat inspection laws coincide. They maintain it is sufficient to destroy the affected parts, whereas head, tongue, heart, oesophagus, stomach, intestines and feet are fit for consumption after they have been dipped into boiling water. Perhaps it would be well to mention here Professor Trawinski, of the Department of Hygiene of Food of Animal Origin, University of Lublin, who has carried out extensive experiments on foot-and-mouth disease in the Russian Institute of Research of Meat Production and Processing. He declares, in a recent article (*Med. Wet.*, February, 1946) that the meat is harmless to man five hours after slaughter. The only parts which he condemns as dangerous are the spine in particular, and the bone marrow. The author, being a recognized expert and authority, will no doubt influence the new meat inspection laws of East and South-East Europe. Will it make international exchange of meat and meat products easier? Will it satisfy the M.P. in Parliament who recently asked the Minister of Food what steps he intends to take to protect this island from foot-and-mouth disease which might be carried in meat shipped from the Continent? Above all, what will the opinion be of the epizootiologist and meat inspector of this country? Does not this problem illustrate the necessity of international co-operation?

The confusion is still greater when one considers the judgment of tuberculosis, as nearly every meat inspection law takes a different view. I can well remember the veterinary surgeon's dilemma when dealing with meat export as a variety of rules and regulations concerning practically every country had to be complied with. I often heard the idea of bringing meat inspection laws into an international framework advocated with only such minor differences as were necessitated by local circumstances. To bring about an easier exchange of food in international trade, complicated and varied meat inspection laws should be revised.

Another point is easy access to scientific institutions, which can only be achieved by an international scheme. In an article published in *Medycyna Weterynaryjna* of November, 1946, Professor Parnas, Bacteriology Department, University of Lublin, describes his and Dr. Nowicki's (a government veterinarian) trip to Czechoslovakia, Austria, Switzerland and France. In pre-war times a veterinary surgeon from the East or South-East of Europe had a more or less conservative plan concerning the choice of enlarging or specializing his veterinary knowledge. He went to France to study bacteriology and epizootiology; to Germany if interested in surgery, medicine, meat inspection or anatomy; to Denmark if his choice was bacon production; and to Holland or Switzerland for dairy farming. Britain was not on the ordinary "time-table" although recognized for her breeding and farm stock improvements. The reasons why Britain had no place on the routine list were varied. First of all it seemed to be rather distant, perhaps due to the dividing sea. Then there was the financial question, for the pound was, and still is, expensive. Thus, the subsidies granted by the Governments to people who went to study would be hopelessly inadequate. Some of the blame also rests with the British veterinary profession for not making arrangements to assist their Continental colleagues to visit this country. Germany, for example, provided the following: cheaper travel and lodgings, organized scientific excursions and easy access to undertake research in veterinary departments. To the average Continental veterinary surgeon, it appeared that his British colleagues were not particularly anxious to receive him. For eight years, I myself did not meet even one British colleague in our College, whereas French, Germans, Czechs, Bulgars and Yugoslavs took special courses, higher degrees or just looked round.

Tempora mutantur and since 1940 the views of many sceptics have entirely changed. Britain has not only offered hospitality but even given a home to many allied colleagues. During the darkest days of the war, Czechs, Greeks, Poles, Yugoslavs and others have found every facility to start or continue their veterinary studies, work or research. The veterinary laboratories at Weybridge, Compton, Cambridge and Gilmerton (Moredun Institute) opened their doors to allied veterinary surgeons, giving them the opportunity to continue research work and study all that was done in their departments to enable them to start reconstruction in their own countries on the cessation of hostilities. British veterinary colleges, especially the Royal (Dick) Veterinary College, Edinburgh, admitted allied teachers, students and post-graduates. The generous hospitality shown by this College to Poland will not be forgotten in veterinary history. For over three years in this old Scottish centre of veterinary teaching, a Polish Faculty trained its own students. At one time scarcely a department was without an Allied colleague who did research work for a veterinary degree under the supervision of the professors of the Royal (Dick) Veterinary College. This was indeed a splendid example of international veterinary co-operation and should not be abandoned now that peace has been proclaimed. Whenever Europe's devastated countries are able, they should, and will, repay their debts of gratitude towards their British colleagues. "This kind of help given to us by the Allied Nations can be met only with deep gratitude by our nation" (translation from *Medycyna Weterynaryjna*, October, 1946).

Continental scientists and professional workers are seeking a new centre—a pleasant one, devoid of dark memories. Where this place is to be found *The Observer* of December, 1946, may answer for me: "With doctors all over the world turning to Britain for specialist trainiug, London University has made big plans to help them. . . . Since July, 1945, about 600 applications have been received from all over the world."

Having the privilege of being a member of the British as well as the Continental veterinary profession, may I make the following suggestion? Britain can, and should, replace Germany in the field of our professional interest and progress. The only "but" exists in Hygiene of Meat and Food of Animal Origin. This "but" is due to the fact that there does not exist a Department where the visitor could do research under the supervision of a specialist in that subject. Otherwise, even in that branch, Britain has much more to offer the foreign visitor than Germany could, so far as the most up-to-date meat production plants, cold stores and harbour installations for dealing with meat, meat products and dock inspection of these are concerned.

In return, the Continent is able to offer British veterinary colleagues, if at present nothing more, a variety of diseases which are known in this country only from text-books. Free exchange of students and research workers could add to and assist the efforts to secure lasting peace.

A livestock census in Vienna, showing the losses suffered during the war, reveals that the Austrian capital now has 16,000 pigs. Although this is 9,000 more than in 1945, it is still little more than a quarter of the pre-war figure.

In 1938 a count showed 54,000 pigs in the city, and there were also 13,750 horses and 26,000 oxen, but to-day there are only 9,561 horses and 14,000 oxen. The number of horses has decreased by 1,200 since the end of the war.

CLINICAL COMMUNICATION

Rupture in a Foal and its Reduction

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Subject.—A bay Shire filly, about four months old at time of accident.

History.—One morning the foal was found grazing in the field with a large rupture in the left abdominal region. Strange horses had broken into the field during the night so it was presumed that the rupture was caused by a kick.

Examination.—The animal was examined and a large rupture was found to be present about nine inches in front of the stifle and at a slightly higher level. A tear six to seven inches long could be felt in the muscle and extending antero-dorsally. Reduction of the viscus could not be effected in the standing position. The first visit was made on 5.9.45 and no treatment was advised. A second examination one month later revealed no change in the rupture, it being half the size of a football. It was decided to operate, a very guarded prognosis being given.

Operation: The animal was fasted overnight and was led on to a bed of straw, 18 inches thick, in front of the stable door. The animal was narcotized, using chloral hydrate intravenously until it went down. A 10 per cent. solution was used and approximately 4 drachms of the drug was administered before the animal assumed the recumbent position. The chloroform mask was now attached and deep anaesthesia induced. Half an ounce of chloroform was first applied and increments of quarter of an ounce added as required to maintain satisfactory anaesthesia. No ropes had been used for casting and the animal was now placed on its back and the legs held apart by four assistants. After preliminary clipping and cleansing an incision twelve inches in length was made through the skin, over and in the direction of the slit in the muscle. Immediately one came upon loops of small intestine and the edges of the muscle, by now perfectly healed, were visible. The muscle was of course mainly the internal oblique with the aponeurosis of the external oblique covering it. Reduction of the intestinal mass was now attempted, but proved difficult and slight bruising of the viscus did no doubt occur. It was only after raising the hind part of the animal that reduction was eventually effected. Two ounces sulphanilamide powder were now sprinkled into the abdominal cavity. The muscle edges were now nicked with a scalpel one-quarter inch deep at one-quarter inch intervals. Next the edges of the muscle had to be approximated and thick catgut was used. By the application of mattress sutures deeply embedded in the muscle and exercising very considerable tension the muscle edges were at length got into apposition. It is emphasized that only one suture was used to include muscle and peritoneum. The subcutaneous fascia was somewhat ineffectually sutured using No. 1 catgut and a further one ounce sulphanilamide was sprinkled on. The skin was sutured using silk mattress sutures, but unfortunately and avoidably much dead space was left.

The animal was now carefully dragged into a loose box in the stable which was well bedded. The diet prescribed was bran mashes with small quantities of hay.

Prognosis.—This was very grave indeed due to (*a*) the prolonged handling of the intestines, (*b*) the tension required to bring the muscle edges into apposition.

Subsequent History.—The operation was carried out on 15.11.45. The next visit was on 18.11.45. The animal was bright and feeding well. There was, however, a large swelling at the site of operation. Indeed this was about the same size as the original rupture. Instructions were left to keep the animal quiet and not to dress the swelling in any way.

A subsequent visit on 25.11.45 showed the swelling to be very similar to that found on the previous visit. Hot fomentations were now prescribed, it being evident that a suppurating focus was present, and the skin sutures were removed, the edges having united. The area was bathed with warm water for 20 minutes night and morning and the swelling was found to have burst and discharged a large amount of pus on examination on 10.12.45. Further progress was uneventful and on examination on 5.2.46 the swelling had completely disappeared and only a small amount of fibrous tissue marked the site of operation.

Conclusions:

1. Given reasonable asepsis, the considerable resistance of the intestine of the horse to infection.
2. The importance of deep mattress suturing with thick material to prevent tearing where tension exists.
3. The importance of elimination of dead space. We are of the opinion that if the skin had been trimmed prior to suturing to obviate dead space, the troublesome and unpleasant sequelae would have been prevented.

NEW INSTRUMENTS AND APPLIANCES

The Electric Stethoscope

by

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It has to be conceded that the binaural stethoscope, with all its indisputable diagnostic value, has many limitations. For the veterinarian, it is at its best for the auscultation of the heart in the dog; at its worst for the auscultation of the lungs in cattle and the horse. The defects of the instrument, which in its present form has evidently reached an evolutionary end, are innate. Its diagnostic value, within these limitations, is determined not only by the care and experience of the individual examiner, but depends fundamentally on his audio-discrimination. It requires only a consideration of the wide differences between individuals' faculties for musical analysis to apprehend how diverse this aptitude may be, apart from the possibility of frankly defective hearing. As with colour-vision, it is a question of the quality of organic function over a range of frequencies or spectrum.

The frequencies of the thoracic sounds range from subsonic, inaudibly low frequencies for the heart (Samson Wright) to frequencies (normal) of some 1,700 cycles per second at the terminal bronchioles (Norris Landis (1938*f*). Between the larynx and the main bronchi the frequency rises from 400 to some 1,000 cycles. In the diseased lung higher frequencies may be encountered.

The binaural stethoscope has a limited frequency range, varying for each instrument and even with the manner of its use. Thus with heavy pressure on the chest-piece higher frequencies are accentuated and the low-note range reduced. Like all other acoustic devices each instrument has resonance characteristics which entail the exaggeration of certain tones or frequencies, while others (which may be the very ones of clinical interest) are damped. Such a performance has the added disadvantage that the discrimination of the ear tends to suffer, the augmented tones detracting from the rest. It is the interplay of these factors with the auditory idiosyncrasies of each individual that may make one man prefer a stethoscope that is adjudged of inferior performance by another. Similar factors operate with the phonendoscope, which has high-note preference.

A further difficulty with the stethoscope is that it is not possible to maintain really satisfactory, scientifically unimpeachable records of cases. Elaborate systems of recording have been developed by medical specialists, but not only are these hardly suitable for general use, but one cannot fail to take exception to records of sound-phenomena that are maintained by words or description. How, for example, can a sound be "moist" or "dry"? Each observer has to apply what are essentially his own individual standards, with no scientific assurance of a common basis, and audio-memory, which must be held in considerable suspicion as a scientific apparatus, plays far too important a rôle.

Thus auscultation must be considered rather an art than a science. And while art has its admitted place everywhere in diagnosis, it must be suspected that there is here an excess of it. This is undoubtedly one of the reasons why auscultation is regarded by many competent authorities with some misgiving and even scepticism, as a recent discussion at the Royal Society of Medicine testifies. Certainly it has never enjoyed with our very realist profession the excessively high regard which it has sometimes been accorded elsewhere.

Electro-stethoscopy

The possibilities with radio-amplification in stethoscopy have been recognized for years, but technical difficulties have generally obstructed the development of a practical machine, and the consequent poor performance has militated against the repute of the apparatus. Microphone construction constituted perhaps the major difficulty. The units were not compact enough; adventitious noise was excessive; and airborne sounds were picked up too readily and interfered. The high fidelity of modern radio systems has disposed of another obvious difficulty, and formerly the sound-reproductive units do not appear to have been satisfactory.

As Donovan (1944) observes: "An amplifying stethoscope is not primarily an instrument for making sounds many times louder. . . . The major advantage . . . is that the intensity can be adjusted

as desired, and thus a number of modifying characteristics which cannot be overcome with the acoustic stethoscope are eliminated." There are, however, numerous other advantages.

Not only need none of the cited limitations of the acoustic stethoscope obtain with the electric one, but vast new possibilities arise, and though these may be expected to develop slowly, it is not to be doubted that a new era in auscultatory practice is opened. It is surely a matter for astonishment that, at the transaction of the Royal Society of Medicine referred to, where stethoscopy fought a pitched battle with radiography as a diagnostic measure, no single reference to the electric instrument was made. In this, as in certain other aspects of medical physics, American workers seem to have taken the lead.

It was possible, with the generous support of the Principal, for the writer to procure for the Royal Veterinary College an electric stethoscope, and the instrument is of sufficient novelty and promise to merit a report.

The Apparatus

The assembly comprises a chest-piece (stethophone), an audio-frequency amplifier, and a loudspeaker.

The chest-piece of the College instrument is a piezo-electric* crystal microphone by Shure Brothers of Chicago,† specially designed for the purpose. It is in the form of a flat metal cylinder just exceeding one and a quarter inches in diameter and less than an inch thick. It is thus extremely compact, and precise in use. While highly sensitive to the body-sounds, it is remarkably insensitive to airborne or acoustic sounds, and thus extraneous noise is ignored. It is sensitive up to 1,500 cycles, but at higher frequencies, like all crystal microphones, its response falls off rapidly, and is stated in the manufacturer's data sheet to be reduced as much as 10 db. at 2,000 and 25 db. at 8,000 cycles. Its performance is thus outstandingly good for the heart. Its output voltage is stated to be, for an average (human) heart beat, of the order of 5 to 10 millivolts r.m.s.

The chest-piece is connected by a screened lead to the amplifier, and it is a matter of prime importance that the input impedance, as required by the makers of the stethophone, should be high enough (5 megohms). This is unusually large, but lower values will be found seriously to impair the performance.

The amplifier is a mains-operated, three-stage, resistance-capacity-coupled assembly with output in push-pull at 15 watts.‡ Its only special features are additional valve-screening, and the incorporation of three tone-controls for high, medium and low frequencies respectively, with a smooth filter action. The low and medium controls serve to amplify their particular frequency-ranges to the exclusion of the high, and are invoked for auscultation of the heart. The high control amplifies the high frequencies to the exclusion of the low, and this and the medium control are appropriate for auscultation of the respiratory sounds. With this control full on and the low control at zero, the heart sounds are so attenuated as to be hardly audible, with obvious advantage. With all controls in use, all frequencies are represented, and the auscultatory effect, both in quality and volume, is manifestly superior to that with the best acoustic stethoscope.

The only sound-reproducing apparatus in use so far at the College has been a loudspeaker. This is a standard unit and performs well, but there is no doubt that this is the weakest point in the apparatus and that even better performance could be obtained. It is possible that a team of two loudspeakers in parallel, designed to handle a high and low frequency-range respectively, would afford the best results (as is the practice in certain high-quality radio sets).

In contrast with loudspeakers, the effect with such earphones as the writer was able to try out was extremely poor—sufficiently so to condemn the instrument in use with them. Though these were of the moving-coil type, the effect was "tinny," and of no value. It would appear that this need not be the case, however. Moving-coil instruments are obtainable which will handle frequencies from 30 to 10,000 cycles (Wente & Thuras (1931)), and such as these should perform admirably. Indeed Donovan (*op. cit.*) seems to have obtained the best results with earphones, and prefers them to the loudspeaker. A number may be attached in parallel for demonstration purposes. This may well be preferred in human medicine, where it is undesirable that the patient should hear the proceedings, but this consideration will only sometimes apply in veterinary cases.

Uses and Applications

A self-evident advantage of the electric stethoscope over the acoustic instrument is for teaching and demonstration. Instead of each student in turn having to sample the case as best he can, the entire class may hear it simultaneously while its features are discussed. A similar facility is that two or more observers may consider a case together, as at consultation, with some advantage.

There is hardly need to mention the obvious possibility of taking sound-records of cases (for purposes of teaching or otherwise), and the advantage accruing.

Another advantage is that internal auscultation becomes for the first time possible. The microphone is of such a size that it may readily be passed inside a large animal, and a number of applications spring to mind. Thus on one occasion it was possible at rumenotomy to pass the stethophone (suitably protected) into the reticulum against the heart. Uniquely clear auscultation resulted, and the value of this at rumenotomy for the exclusion of traumatic pericarditis is self-evident.

These, however, by no means exhaust the scope of the instrument. The sounds, once in electrical form, become as amenable to manipulation as any other electric current, and entirely new techniques become applicable.

Thus the wave-forms may be studied visually on the cathode-ray oscilloscope* (Donovan (1944); Rappaport & Sprague (1941); the result being a transverse representation of the longitudinal-progressive variations in pressure of the original sound-waves.

By this means the four sounds of the heart may be seen as vibrations on the trace, including the presystolic first "sound," of sub-sonic frequency. Murmurs appear as vibrations, breaking the smooth, horizontal trace which connects the four normal vibrations, in accordance with the site of the valvular lesion. Thus the sounds may be heard and seen simultaneously. By the use of a double-beam oscilloscope† simultaneous observations of the form of the sound-waves and of the electro-cardiogram may be made, and indeed this is recommended in order that the phase of the cardiac cycle may be correlated with the wave-pattern. With serious valvular disease, where the bruit may smother the definition of the normal beat, the phase of the cycle may otherwise be obscure (as it will also be auditorily).

For the lungs, similar visual analysis is possible, and where there is disease, modifications of the normal wave-pattern become evident (Dunn, Rahn, & Cochran (1942)). This, however, is a field of clinical research which is almost virgin.

Not the least advantage of the visual representation of the thoracic sounds is that it permits of photography of the resultant oscilloscopic picture, and thus, for the first time, scientific accuracy becomes possible in auscultatory records, while it also automatically eliminates the possible auditory errors and phenomena discussed earlier.

Reference has already been made to the use of filters and selective amplification. The system provided on the College instrument is at its simplest, for any desired frequency or band of frequencies might in fact be either amplified, attenuated, or totally eliminated from the sound-picture. Most of the pathological heart sounds and some of the pathological respiratory sounds lie outside the normal frequency-range. It should, therefore be possible, with appropriate circuits, to filter off the normal, leaving the pathological. Indeed, by the use of a battery of electrical filters, it should be possible to effect something in the nature of a "spectrum-analysis" of the thoracic sounds. Such a technique would reduce to a mensurable, quantitative basis what has hitherto had only qualitative value. It is noteworthy that Paroli (1930) applied this principle, apparently with success, to the acoustic stethoscope. By means of acoustic filters (his "phono-selectoscope") he was able to exclude the normal frequencies and study the pathological residue. The correlation of such data with the precise pathological condition offers a most extensive field for future research.

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* The electrical principle of this is of course that changes in the pressure to which the crystal is subjected generate a proportionate e.m.f., so that the pressure waves of sound are converted into a corresponding electrical pattern which may forthwith be amplified. These microphones were in use during the war by the Civil Defence for the detection of unexploded bombs, buried casualties, etc.

† Supplied by their agents, John Bell & Croyden, 117, High Street, Oxford.

‡ Supplied by Trix Electrical Co., Ltd., 1-5, Maple Place, London, W.1.

* The oscilloscope is an easily operated electronic instrument which casts on a fluorescent screen, in brilliant definition, an exact replica of the wave-form of whatever electric current may be applied to its terminals. Thus ordinary alternating current from the mains appears as a regular wavy line.

† The double-beam instrument permits of the simultaneous observation of two wave-forms, the traces being arranged one above the other.

The College instrument was intended primarily for teaching, and, with the necessary additions and modifications, for extended investigations on the lines indicated. For these purposes portability was a very secondary consideration, and the apparatus described is hardly suitable for use "in the field." It had been particularly hoped, however, that an instrument would emerge which could perform advantageously in cattle and the horse, where auscultation is so difficult, and generally unsatisfactory. It is already demonstrated that technical difficulties need no longer obstruct the issue; in particular that the piezo-electric microphone used provides a complete answer to the outstanding difficulty of adventitious noise, scratching and crackling, a particularly serious matter in fur-bearing animals. This microphone, connected to a miniature battery-operated amplifier of a highly portable type, as for example is incorporated in the Cintel metal detector of the Cinema-Television Co., and operating high-quality moving-coil earphones, could provide a handy and self-contained instrument of general scope. The only difficulty to be anticipated is that for examination of the heart in large animals the whole assembly must be capable of handling with fidelity the range of unusually low frequencies which experience confirms are strongly represented in the heart sounds in large subjects.

The writer cannot do better than close with a quotation: "I often say that when you can measure what you are speaking about, and express it in numbers, you know something about it; but when you cannot express it in numbers, your knowledge is of a meagre and unsatisfactory kind; it may be the beginning of knowledge, but you have scarcely in your thoughts advanced to the stage of science, whatever the matter may be." (Lord Kelvin (1883).)

This is doubtless a counsel of perfection in the present state of much biological and most clinical work, but the ideal must always remain, and these remarks are peculiarly appropriate to the vexed question of the value of auscultation, while at the same time they indicate one of the special recommendations of the instrument under discussion. This will undoubtedly in due course largely supersede the less efficient and more limited acoustic model.

ACKNOWLEDGMENTS

My acknowledgments are due to Professor J. B. Buxton, M.A., F.R.C.V.S., Principal of the College, and to Professor C. Formston, F.R.C.V.S., for supporting the proposition; to the engineers of Trix Electrical Company, for their interest in its development; and to Messrs. John Bell & Croyden, who with much trouble procured the stethophone from America.

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ABSTRACTS

[Improvement of the Solution of Calciumborogluconate for Subcutaneous Injection. SEEKLES, L., & HAVINGA, E. (1946.) *Norsk. VetTidsskr.* **58.** 433-445.]

The injection of solutions of calcium salts into animals often causes local irritation which depends chiefly on the concentration of calcium ions and on the final *p*H of the liquid injected. Experiments in various species of animals confirmed these findings. The authors found that calcium-calciumborogluconate solution* (*p*H 7·0 to 7·4) produced marked local reactions when injected subcutaneously in rats or rabbits, while slightly less irritation was caused by the use of magnesium calciumborogluconate (*p*H 6·6) or acid calciumborogluconate solution (*p*H 4). The least irritant solution was found to be sodium calciumborogluconate (*p*H 7·2) and this solution gave good results in calves and in cows in a large-scale field trial. The solution is prepared as follows: 62 grammes of calciumgluconate are boiled with 12 grammes of boric acid in 300 c.c. of distilled water. When the solution has become clear it is allowed to cool and 14 grammes of sodium bicarbonate are added and the liquid boiled again. After cooling, the solution is made up to 400 c.c. with distilled water and is filtered through a hard filter. Boiling for one hour in a water bath will sterilize the final product.

B. W.

* The method of preparation of calcium-calciumborogluconate solution is as follows: 158 c.c. of distilled water and 3·15 grammes of the purest calcium oxide are added to 250 c.c. of a solution of acid-calciumborogluconate and the mixture is heated.

* * * * *

[Experimental Treatment of *Trichomonas foetus* Infection in Bulls. BARTLETT, D. E. (1946.) *Amer. J. vet. Res.* **7.** 417-431.]

In contrast to *Trichomonas foetus* infection in females, bulls are usually considered permanently infected. The less valuable bull is generally disposed of or used for infected females but valuable bulls may be worth treating. Recently infected bulls appear easier to cure than old-standing infections and various methods of local treatment have been applied in the past with varying results.

In the present series of cases several actively trichomonicidal agents (including sodium perborate and Lugol's iodine) were used by local application without success.

The systemic administration of iodide was, however, shown to be successful in six out of ten infections treated in bulls. Potassium iodide was given orally at 10 grammes per 1,000 lb. for 23 to 25 days and a week elapsed before iodine was detected in preputial material.

Sodium iodide given intravenously in three to five doses at two- or three-day intervals at a rate of 30 to 50 grammes per 1,000 lb. was considered more practical than oral dosing. Iodine reached the prepuce in half to two hours.

The use of sodium iodide intravenously trice at 30 grammes per 1,000 lb, followed by potassium iodide orally at 8 to 10 grammes per 1,000 lb. for 30 days was unsuccessful in the two cases treated.

The combination of oxidizing douches (chloramine T) with intravenous sodium iodide was not found advantageous.

All cases treated showed the usual symptoms of iodism with return to normal a few weeks after discontinuance of the treatment.

Contrary to belief, no evidence of permanently harmful effects on spermatogenesis was observed though during treatment significant numbers of spermatozoa with looped tails or reversed movement were found frequently in some samples.

In no samples were there ever more than half abnormal forms. Subsequent to treatment semen samples appeared normal as was confirmed by normal pregnancies following their services.

J. S. S.

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[Treatment of Strangles with Sulphanilamide. MINETT, F. C., & EDWARDS, W. P. S. (1945.) *Ind. J. vet. Sci. and Anim. Husb.* **15.** 1-16. (39 text-figs.).]

Forty-eight cases of strangles were treated with sulphanilamide. A corresponding number of control cases of apparently equal severity were selected for observation at the same time, but all sulphonamide treatment was withheld. Clinical details and temperature charts are given. As would be expected from the nature of the disease, the results are not apparent in all cases. The beneficial effects consist mainly in a reduction of fever and probably to some extent in the localization of abscesses. There was no difference in the duration of hospitalization in the two series. While the question of adequate dosage and duration of treatment is always important, sound clinical judgment is required in using the sulphonamides. Thus, in outbreaks of strangles, sulphanilamide might be used on animals in which the disease is not running the normally mild course. It would probably be still more profitable to use the drug on very early cases when fever is a pronounced symptom. There is need for further properly controlled enquiry on cases selected as falling within these two categories.

The possibility of combining sulphanilamide treatment with improved methods of vaccination is a matter for the future.

THE HELPFUL HORSE

"Has not insufficient recognition been given to the horse for its help in supply outlying rural communities during the blizzards and the floods, when most mechanical transport failed?" writes Mr. J. H. Webster, of Birmingham, in a recent issue of *The Daily Telegraph*. "We have read much about bulldozers and aeroplanes trying to defeat the snow, but seldom heard about the work of the horse sleighs, pack-horses and saddle-horses. In the same way we have heard much about amphibious Army vehicles defeating the floods, but little about the horses and carts which were the only means of getting through in many flooded areas. At present it is only possible to work on some of the heavy land with horses."

Quarterly Meeting of Council, N.V.M.A.

Summary of Proceedings

A well-attended meeting of the Council of the National Veterinary Medical Association of Great Britain and Ireland, with the President, Professor W. McG. Mitchell, in the chair, was held at the Connaught Rooms, Great Queen Street, Kingsway, W.C.2, on Wednesday, March 26th, 1947.

Few controversial topics arose, and the readiness with which the voluminous reports of the committees were, speaking generally, accepted, affords evidence that these recently reorganized agencies for conducting the affairs of the Association are functioning smoothly and efficiently. Council, in fact, concluded its business by lunch time.

Any remaining apprehensions as to the possibly adverse effect upon the Membership of the increase in subscription were allayed by the Secretary's announcement that the roll now numbered 3,097—an increase of 34 on the figure after the January meeting.

The first comment to be made, by the President, on the report of the General Purposes and Finance Committee, also gave cause for satisfaction. It related to the agreement arrived at, after a round table discussion at a recent meeting at Belfast between representatives of the North of Ireland Division, N.V.M.A., and the Ulster Chemists' Association at which a Director of Messrs. Evans Medical Supplies, Ltd., and he were present, whereby not only would Evans Medical Supplies, Ltd., restore their product "Pirevan" to their "restricted" list, but that the principle should be accepted that chemists should carry a stock of all Evans' "restricted" products for distribution to veterinary surgeons only or against a veterinary surgeon's prescription—not direct to farmers. This agreement (the effect of which will be to regularize their policy throughout the United Kingdom) was unanimously endorsed at a meeting of the North of Ireland Division, N.V.M.A., the following day, and it is expected that early ratification of the agreement will follow after a meeting of the Ulster Chemists' Association.

This Committee had accepted the view of the Parliamentary and Public Relations Committee that the present is a very opportune time to establish the full-time post of Public Relations Officer, and it requested authority from the Council to proceed. The President intimated that the chief duties of such an officer would be to foster contacts and relations with outside bodies, and the Press: he must be a man who was keenly interested in the work and advancement of the profession. In the prolonged discussion that followed it was stressed that in such activities the emphasis should lie more upon keeping the facts of professional work, relationships, and ideas before the public, than on "propaganda." Some members wanted the recommendation to be referred back for further consideration and clearer definition of duties; eventually, however, there was a big majority in favour of acceptance, and for an exploration of the field of available men—preferably, a veterinarian; otherwise, a journalist.

The Committee is reviewing the Calfhood Vaccination Scheme, and a suggested new scheme—to run concurrently—has been approved in principle for discussion with the Ministry. Features are that vaccination may be carried out at any opportune time during the course of the practitioner's work on the farm, that the scheme should be limited to calves between six and twelve months of age, and that the vaccine be supplied free of charge.

The report of the Overseas Services Committee revealed activities of so important and comprehensive a nature as thoroughly to justify its recent elevation to the status of one of the Standing Committees of the Association. Recommendation is to be made to the Annual General Meeting that representation of affiliated oversea associations on Council be provided for in a new Article of Association and recommendations have been agreed for the grouping of such associations for the purpose of apportioning such representation. With a view to making co-operation between the Committee and the Overseas Associations more effective, the lines upon which each body might take independent, yet supporting, action, are being indicated to them.

In regard to recruitment to the Colonial Service, Council warmly endorsed the Committee's statement that while it realizes that every member of the Royal College, whether of British or foreign nationality, has a right to apply for posts at home or overseas, it is in the interests of the profession as a whole that all members should support the Association by not accepting any appointment unless the salary and conditions offered are suitable and acceptable to the Association. Among many promising developments in the work of this Committee is the arranging of addresses to students on work in the Colonial Veterinary Service.

Both the Veterinary State Medicine Committee and the Technical Development Committee have had under consideration the Scheme for the Control of Certain Diseases of Dairy Cattle. The Association's proposal that a scheme of an advisory nature should replace the existing scheme is to be the subject of an early meeting of the N.F.U. and N.V.M.A. Liaison Committee, while the Technical Development Committee has agreed that the revised recommendations for the control of Johne's disease should incorporate a paragraph discouraging the use of the johnin test. The Association's proposed scheme for the acquirement of accurate data on the incidence of disease is being favourably received by the Ministry.

The Ministry is to meet representatives of the Association to discuss the N.V.M.A. proposals for increasing the fees for part-time work. Meanwhile Council accepted a scale of revised fees for tuberculin testing to become operative when the single test replaces the double intradermal comparative test, on the understanding that this would in no way prejudice the Association's claim for a general increase of fees.

The Organizing Committee is working closely with the Parliamentary and Public Relations Committee in an enquiry into the facilities available for the treatment of the animals of poor persons, and as a first step a nation-wide survey of all free-treatment schemes is being made. Consideration is being given, also, to the question of the provision of Central Animal Hospitals for use by veterinary surgeons. The establishment of such hospitals in large urban areas, organized and controlled by the profession, was regarded as feasible and was recommended. The report stimulated a discussion of much value and interest. The President expressed the hope that the Divisions would give earnest consideration to these matters, from the point of view of the profession, and thus strengthen the hands of the Association in planning for the future.

Arising from the report of the Home Appointments Committee, members were relieved that the Senior Vice-President could speak of a more satisfactory position, in regard to the salaries of the veterinary staff of the Ministry of Agriculture. Negotiations on this issue are to be resumed, if indirectly, and a delegation from the Parliamentary and Scientific Committee is shortly to meet the Minister and the Financial Secretary to the Treasury. Enquiry is also to be made of that committee as to whether it considers that any action further than a reiteration of the Association's dissatisfaction with the present position, might usefully be taken to place the rates of pay for Officers of the R.A.V.C. on a more satisfactory basis. A revised N.V.M.A. scale of minimum commencing salaries for whole-time veterinary officers appointed by local authorities was accepted by the Council.

Formal record was made, in the report of the Editorial Committee, of the recent suspension, covering two issues, to which *The Veterinary Record*, in common with other weekly periodicals, was subjected in consequence of the fuel crisis early in the year, and of the issue, to members only, of a "token number" hand-produced in the office. The receipt of an official intimation that the paper thus saved will not be available for the enlargement of future issues—inasmuch as none was produced from the mills—is the more disappointing in that an unprecedented number of contributions is being received, including a high proportion of case reports, a development which can be regarded with some confidence as an indication of a marked and, it is hoped, a permanent response to recent approaches to the Divisions in this matter.

Having decided that the approaching Annual and Council gatherings in Edinburgh justified London again as the place for its June meetings (Committees 18th and 19th, Council 20th), members were grateful to one of their number who, in a few moving words, voiced the feeling of deep sympathy felt universally throughout the profession for those practitioners in the Fen and other districts so disastrously inundated by the recent floods. It was agreed that this sense of heartfelt concern for these practitioners in the deprivation and difficulty in carrying on their professional work to which this national calamity has subjected them, should be expressed through the medium of the journal of the Association.

Weekly Wisdom

The original "dictators" of the Roman system were essentially legal officials, and one of the primary riddles of human society has been the resumption of power by the community at the end of a period of crisis.—H. G. Wells (1939). "The Fate of Homo Sapiens."

NOTES AND NEWS

Diary of Events

April 23rd.—Meeting of the South-Eastern Division, N.V.M.A., at Tunbridge Wells (Mount Ephraim Hotel), 2.30 p.m.

April 23rd.—Meeting of the Lancashire Division, N.V.M.A., at Preston (Booth's Café, Fishergate), 3 p.m.

April 25th.—Meeting of the Mid-West Division, N.V.M.A., at Bristol (Bright's Café, Clifton), 2.15 p.m.

April 25th.—Meeting of the Yorkshire Division, N.V.M.A., at York (Royal Station Hotel), 2.30 p.m.

April 26th.—Meeting of the Nutrition Society (Scottish Group), at Dundee University, 11.50 a.m.

April 29th.—Meeting of N.V.M.A. Overseas Services Committee, 36, Gordon Square, W.C.1, 11 a.m.

May 5th.—R.C.V.S. Animal Management Examination, commencing in Edinburgh.

May 6th.—R.C.V.S. Council Election. Last date for receipt of nominations.

May 7th.—Meeting of the Editorial Committee, N.V.M.A., at 36, Gordon Square, W.C.1, 2.30 p.m. **[Brought forward to first Wednesday in the month.]**

May 7th.—Special Meeting of the N.V.M.A. Technical Development Committee, at 36, Gordon Square, W.C.1, 11 a.m.

May 8th.—**Special Meeting of Council, N.V.M.A.,** at the Conway Hall, Red Lion Square, London, W.C.1, 2 p.m.

May 8th.—Special Meeting of N.V.M.A. General Purposes and Finance Committee, 36, Gordon Square, W.C.1, 11 a.m.

May 9th.—Meeting of N.V.M.A. Parliamentary and Public Relations Committee, 36, Gordon Square, W.C.1, 11 a.m.

May 20th.—R.C.V.S. Council Election. Voting papers to be issued.

May 21st.—Spring Meeting of the Eastern Counties Division, N.V.M.A., at Bury St. Edmunds (Angel Hotel), 2.30 p.m.

May 23rd.—R.V.C. Students' Union Society Annual Ball, Grosvenor House, Park Lane, W., 8 p.m. to 1 a.m.

May 27th.—R.C.V.S. Council Election. Voting papers to be returned.

June 3rd.—R.C.V.S. Annual General Meeting.

June 3rd and 4th.—R.C.V.S. Committee Meetings.

June 5th.—R.C.V.S. Committee and Council Meetings.

June 26th and 27th.—R.C.V.S. Written Examinations.

July 28th—Aug. 1st.—N.V.M.A. Annual Congress in Edinburgh.

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R.C.V.S. Council Election

We are informed by the Royal College that the following nominations have been received to date. The eight members due to retire by rotation in 1947 (denoted by an asterisk) are all seeking re-election.

Name	*Address*	*Proposers*	
Burrow, H.	Streatley	J. Holroyd	G. H. Locke
*Buxton, J. B.	Streatley	H. W. Dawes	T. Dalling H. W.
*Gould, G. N.	Southampton	W. M. Mitchell	Steele-Bodger
*Mitchell, T. M.	Sunderland	T. Dalling	W. C. Miller
*Procter, J. W.	York	G. H. Wooldridge	W. Nairn
*Share Jones, J.	Wrexham	T. Dalling	H. W. Dawes
*Steele-Bodger, H. W.	Tamworth	G. H. Wooldridge	T. Dalling
*Sumner, H.	Liverpool	J. G. Wright	J. Holroyd
*Wooldridge, G. H.	Hendon	H. W. Dawes	G. P. Male

Nominations for election must be received not later than Tuesday, May 6th, 1947. The result of the election will be declared at the Annual General Meeting to be held on Tuesday, June 3rd, 1947.

. . . . .

Publication of Election Addresses

The election addresses of candidates for Council, R.C.V.S., will be published in our issue of May 17th. Those who desire to submit such addresses for publication are requested to note that they must be received by the Editor of *The Veterinary Record*, 36, Gordon Square, London, W.C.1, not later than **Monday, May 12th**, and that they must be limited to 250 words.

New Appointments to the Staff of the Ministry of Agriculture

As notified in recent issues, Council, N.V.M.A., has decided that no advertisements for appointments to the veterinary staff of the Animal Health Division of the Ministry of Agriculture shall be accepted for *The Veterinary Record* pending the settlement, in a manner satisfactory to the Association, of the question of the status and salaries of the Veterinary Officers of the Division.

In the meantime, any members of the profession who may, nevertheless, contemplate applying for such posts, should these be advertised elsewhere, are requested first to communicate with the General Secretary of the Association at 36, Gordon Square, London, W.C.1.

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Questionnaire to Divisions, N.V.M.A.

Honorary Secretaries of Divisions who have not yet replied to the General Secretary's letter of December 23rd are asked to treat the matter as one of urgency. They are reminded that, should they require further copies of the questionnaire for circulation to their members these are available, on request, from 36, Gordon Square, London, W.C.1.

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PERSONAL

Retirement of Capt. E. J. Burndred, M C., M.R.C.V.S

"With the retirement to-day of Captain E. J. Burndred, M.C., M.R.C.V.S., Divisional Inspector of the Ministry of Agriculture's Animal Health Division, farmers in Leicestershire lose the services of a trusted adviser and friend," says the *Leicester Advertiser* in its issue of March 29th, and continues: "Trained at Liverpool University where he had a very successful academic career, Captain Burndred qualified M.R.C.V.S. in 1908 and D.V.H. in 1909. After some years' experience of public health work at Sheffield and Blackburn he was in 1915 commissioned in the Army Veterinary Corps and was successively veterinary officer with artillery, officer commanding mobile veterinary section and finally D.A.D.V.S. with rank of Captain. Mentioned in Despatches in June, 1917, he was awarded the Military Cross in June, 1918.

"Captain Burndred took over his present appointment in Leicester in 1938, and during the time he has been here he continued to act as Examiner in Medicine to the Royal College of Veterinary Surgeons and Examiner in Meat Inspection to the Royal Sanitary Institute of which he is a Fellow.

"His work on the tuberculosis (attested herds) scheme and his encouragement to those building up tuberculin-tested herds are widely recognized and a measure of the success which he has enjoyed is given by the progress made. In 1938, when he came to the county, there were two attested herds in Leicestershire and in 1947 there were over 80 attested herds and 45 herds licensed tuberculin tested.

"Those who have toiled to improve the health of their herds will long remember the patient help and encouragement given to them by Captain Burndred and his many friends will wish him every happiness in his retirement."

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Golden Wedding.—Welch—Haggar.—At Great Shelford, Cambs., on April 20th, 1897, Percy John Welch, M.R.C.V.S., to Julia Florence Haggar, of Great Shelford.

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Marriage.—Carr—Williamson.—The marriage took place at the Parish Church, Hungerford, on March 24th, 1947, of Robert John Carr, M.R.C.V.S., fourth son of Mr. and Mrs. Harry Carr of Lewes, Sussex, and Iris Marian Williamson, younger daughter of Mrs. E. Williamson, of Earley, Reading, and the late Mr. W. Williamson. E. W. Schwabacher, Final Year Student, R.V.C., was best man.

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R.C.V.S. OBITUARY

Rees, Brychan Jeffries, Captain R.A.V.C. (T.F.) (retd.), Picton Road, Tenby, Pembrokeshire. Graduated London, May 16th, 1889. Died April 8th, 1947.

Mr. B. J. Rees, whose death we record above with much regret, was the father of L. B. and F. B. Rees, the renowned steeplechase jockeys, both of whom won the Grand National—F. B. Rees in 1921 on Shaun Spadah, L. B. Rees in the following year on Music Hall.

GENERAL OBITUARY

Mr. Alexander Murdoch, C.A.

We record with much regret the death, which occurred suddenly on April 5th at his farm East Hall, Cambuslang, of Mr. Alexander Murdoch, a most successful exhibitor and stock-breeder whose deep and practical interest in veterinary education was valued highly by the profession, particularly in the West of Scotland. He rendered great service as chairman since 1933 of the governors of the Glasgow Veterinary College, which he piloted through some of its most difficult years when the College was receiving no grants from the Government.

Mr. Murdoch combined husbandry with his professional duties as C.A., and undertook a wide range of public work. He was chief partner of the well-known firm of M'Lay, M'Allister & M'Gibbin, C.A., Bothwell Street, Glasgow.

In the spring of last year Mr. Murdoch resigned from the important and responsible post of livestock and meat officer for the Ministry of Food, covering the whole of the southern half of Scotland. This appointment was taken up on the invitation of Sir Henry French when the Food Defence Department was set up two years before the war broke out. He had thus to organize the control machine for all the counties of Scotland south of the Forth.

For many years he was a member of the Highland and Agricultural Society's Board of Directors, and for a term of three years —an unusually long period—acted as chairman.

Mr. Murdoch may be said to have been a pioneer of organized milk marketing in Scotland, as he served as chairman to the Scottish Milk Agency, forerunner of the existing Scottish Milk Board. When the Board was constituted Mr. Murdoch was appointed auditor, and had continued in that office since 1933.

He inherited from his father a very keen interest in Clydesdale horses, and as an exhibitor at the "Highland" won the Cawdor Cup for females on no fewer than six occasions, a remarkable record.

The first non-titled person to become honorary secretary of the Highland Society, he also exercised much influence in the councils of the Clydesdale Horse Society over many years. He was the Society's third honorary treasurer in its 70 years' history, and had acted in that capacity for a period of 21 years. Last year he terminated office as president and was appointed the Society's second honorary president, the first being Mr. James Kilpatrick.

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CENTRAL ADVISORY COMMITTEE ON ARTIFICIAL INSEMINATION

The Minister of Agriculture has appointed the Earl of Huntingdon, Joint Parliamentary Secretary to the Ministry, to be Chairman of the Central Advisory Committee on Artificial Insemination, in place of the Duke of Norfolk, K.G., P.C., G.C.V.O., who has resigned. Certain other members of the Committee have also recently found it necessary to tender their resignations, and to fill the vacancies the Minister has made the following appointments: Mr. R. T. Paget, Member of Parliament for Northampton, in place of Mr. R. Donald Scott; Mr. H. Twinch, O.B.E., Chief Livestock Husbandry Officer of the Ministry and at present Technical Assessor to the Committee, in place of Professor J. A. Scott Watson, C.B.E., M.A. The Minister has also appointed Mr. R. Harding Wynne, of the Ministry of Agriculture and Fisheries, to be Secretary of the Committee in place of Mr. C. H. Wake.

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HILL FARMING ADVISORY COMMITTEE FOR ENGLAND, WALES AND NORTHERN IRELAND

Sub-committee for Wales and Monmouthshire

In accordance with Section 32 of the Hill Farming Act, 1946, the Minister of Agriculture and Fisheries has constituted the Subcommittee for Wales and Monmouthshire of the Advisory Committee for England, Wales and Northern Ireland to advise him on the exercise of his powers under the Act in relation to land in Wales or Monmouthshire, and has appointed the following to be members of the Sub-committee for a period of three years from January 22nd, 1947, the date of appointment of the main Committee:

Mr. Harry Lewis (Chairman),* Mr. J. V. Allen, J.P.,* Captain G. L. Bennett Evans, Mr. F. Ll. Griffith, Mr. Edward Jones, Mr. Morgan Jones, Mr. David Lewis, M.B.E.,* Mr. C. G. Muir,* Professor J. E. Nicholls, M.Sc., Ph.D., F.R.S.E.,* Mr. Robert Richards, M.P.,* and Colonel J. C. Wynne Finch, M.C.*

Mr. D. Joseph has been appointed Secretary to the Sub-committee, and all communications should be addressed to him at the Ministry of Agriculture and Fisheries, Welsh Department, 17, Eastgate, Aberystwyth.

*Also a member of the main Advisory Committee.

THE GENIUS OF LOUIS PASTEUR

As intimated in our last issue, the Pasteur Exhibition is attracting large attendances at the Science Museum, South Kensington. Lecturing there on Thursday of last week on the life and work of Louis Pasteur, Sir Alexander Fleming, F.R.S., said that the genius of Pasteur was revered in Britain as in France. Throughout his life he was a hard worker—his was not a 40-hour week.

Outlining Pasteur's work from the early stages, Sir Alexander detailed his investigation of the crystals of tartaric and racemic acid, his studies of fermentation and putrefaction, and his experiments and successes in other fields. He combated a disease of silk-worms which was then ruining the industry in France. Later came his successful immunization of dogs against rabies and afterwards human beings. The culmination of his great work was when he showed it was possible to protect man against infection. Penicillin belonged to a class of substances first discovered by Pasteur, and if he had gone on with his work on them, instead of turning to other work considered more important, they might have had penicillin during the last century.

Pasteur, who was an artist of merit, adoring his family and his country, died in 1895. In his lifetime he did enough to make ten men great. He was one of those individuals thrown up at rare intervals in the world's history to restore order out of chaos. The world was in his debt and this country took the opportunity now of rendering homage to a great benefactor.

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HOME FOOD PRODUCTION EMERGENCY

The Farmers' Programme

Measures to increase the home production of food to meet the present emergency were discussed by all sections of the agricultural industry in the United Kingdom at a conference called by the Royal Agricultural Society of England and held at its headquarters in Bedford Square on Wednesday of last week.

Sir Archibald Weigall, who presided, spoke of the necessity for pooling all available resources of knowledge and experience in the face of an alarming situation; and Lord De La Warr, one of the delegates, declared that the country was facing the danger of actual starvation in the next 18 months.

A memorandum, prepared at a preliminary meeting, on which the discussions were based, stated that a very large increase in food production could be brought about provided that it was realized that the country was faced by a food crisis at least as grave as the present shortage of coal.

The delegates formulated proposals which are to be submitted by a deputation to the Minister of Agriculture. These included:—

An immediate statement of minimum requirements of production for all the main crops to cover, at least, the next five years, accompanied by a continuing firm guarantee of prices and markets;

Increased growing of feeding-stuffs and fodder crops, particularly protein-rich crops;

Farmers should immediately be informed that they might keep for their stock a definite proportion of all the grain they could grow, thus enabling them to increase substantially their deliveries of meat and eggs for general consumption.

Price schedules should be designed to emphasize the importance and encourage the rearing and production of livestock and, particularly, the rehabilitation of the hill farmers.

A vigorous campaign for grassland improvement by direct reseeding and other methods; and concurrently, an intensive campaign to encourage the increased conversion of grass into concentrated feeding-stuffs—*e.g.*, silage and dried grass.

The purchase of more feeding-stuffs from oversea, even if these meant the sacrifice of existing alternative uses of our dollar resources.

Additional feeding-stuffs must be used first to enable farmers to rebuild their pigs and poultry stocks.

All possible steps must be taken to recruit more farm workers, and a declaration made that the Government intended to apply to those engaged in agriculture a measure of special deferment in respect of national service.

A special allocation of materials for providing traditional and prefabricated houses in rural areas on the basis of a transfer of 100,000 adult workers from the towns to the countryside, and implementation of the recommendation of the Hobhouse Report on the reconditioning of rural houses.

Increased food rations throughout the year to those working overtime on the land.

The delegates urged particularly that farmers must be told before the end of June the nation's requirements in 1948 so that they may have time to plan accordingly for the production of crops like wheat and potatoes for human consumption and, no less important, the crops needed to sustain an increased head of livestock.

The Times comments, "There is good sense in the further recommendation that no machinery required for food production in this country shall be exported until the demands of home farmers have been satisfied, and in the emphasis placed upon the need for a special housing drive in the agricultural districts so that 100,000 adult male workers from the towns can find homes as well as work in the countryside. The farmers are asking to be allowed to do more than the Government have so far required of them, and the country will expect the Government to take them at their word."

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HILL SHEEP STORM LOSSES

"While the position is far from satisfactory among low-ground sheep it is disastrous among the hill sheep, where the ewe losses have been terrific, and some of the survivors are now so weak and out of condition that they cannot be put back to their usual grazings," states *The Scottish Farmer*, and continues: "Lambing time on the hill farms will be accompanied by further losses but the total loss will not be known for some time to come. It may take from five to seven years for hill ewe flocks to be built up to their former numbers, and the owners, if hard-hit financially now, will be even more so before the building-up process can be accomplished. Sheep losses have already had their repercussions in the store markets, where prices for breeding sheep have risen steeply. Looking ahead to the summer lamb sales, the shortage of numbers will be bound to increase prices and some breeders think these may reach fantastic heights. That may easily happen in connection with breeding sheep; but the Minister of Food's control prices for mutton will exercise a certain restraint on the price of store hoggs; and the feeders, being mostly arable farmers with many troubles of their own this season, will be unable to afford ridiculous prices for store sheep. Store cattle prices are also rising owing to the large numbers that died or had to be destroyed during the storm, and prices may continue to rise as the grazing season approaches."

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THE PHOTO-FINISH: SUCCESSFUL TESTS AT BIRMINGHAM

The new photo-finish apparatus was used experimentally, and later officially, at Birmingham races for the first time on a racecourse in Great Britain.

"Visitors gazed in some astonishment," says *The Times*, "at the fortress-like erection in the paddock which had been built to enable the executive to be the first racecourse to use the photo-finish as an aid to the judge. The tower is about 40 ft. high, and consists of three storeys. The first floor is for the stewards of the meeting, and enables them to have a clear view of the whole course. The second floor is for the judge. The third accommodates the camera.

"Actual photographs are taken of every race, irrespective of the closeness of the finish, but it will be called into use to assist the judge only when it is deemed necessary. The results of all photo-finishes will be on view to the public in the paddock, where a special glass case has been built for their display.

"The tower does not affect the view of people in the paddock, but at least 50 yards of the course inside the Distance is obscured from the view of owners, trainers, jockeys, and the Press."

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AUSTRALIAN PLAGUE OF WILD HORSES

Thousands of wild horses, donkeys, and camels (reports the Adelaide Correspondent of *The Times*) are devastating great areas of the far northern part of South Australia and south-western Queensland, and vigorous measures are being taken to deal with the situation.

Mr. Brooks, one of the most prominent pastoralists in Australia, who is the owner of three large stations, says that the brumbies (wild horses) are becoming a national problem because they multiplied at such an alarming rate during the war through the absence of men to keep them in check. Some owners have already abandoned their holdings where the pests are uncontrollable. On one of his stations alone about 5,000 brumbies have been shot, but the problem remained, and the dingoes were nearly as bad.

Other pastoralists report that thousands of wild horses have been shot in the Oodnadatta and Marree areas. Many stations are using traps built round the waterholes, where 60 to 70 horses are caught at a time. A pastoral inspector states that in 18 months on a 150-mile front of the Cooper river 8,000 brumbies were shot after eating enough to feed 16,000 cattle.

Every contribution made by farmers and others towards the Agricultural Disaster Fund is to be met by an equivalent sum provided by the Government. Many farming M.P.s, however, feel that something more than this "gesture"—as it has been described—is called for in view of the colossal scale of the flood losses.

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The Princess Royal has accepted the presidency of the British Dairy Farmers' Association for 1947.

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The Prime Minister does not consider it necessary to set up a Royal Commission to make recommendations for the administration and co-ordination of the Ministries of Food and Agriculture. He refused in the House to accept a statement that the present policies of the Ministry of Food and the Ministry of Agriculture were incompatible or that the home producer always had the worst of the deal because the two Ministries were diametrically opposed.

CORRESPONDENCE

The views expressed in letters addressed to the Editor represent the personal opinions of the writer only and their publication does not imply endorsement by the N.V.M.A.

Correspondents should write as briefly as possible and letters should not exceed 350 words.

ENTEROTOXAEMIA IN GOATS

Sir,—Members may remember an article entitled "An Investigation into Enterotoxaemia in Goats," which appeared in the December 7th issue of *The Veterinary Record*. In that article I reported that fairly satisfactory results were achieved with pulpy kidney serum in doses of 20 c.c. Since publication subsequent inoculations of pulpy kidney serum given in the particular herd under observation have had unfortunate results.

Doses of 20 c.c. to goats, which had received an inoculation varying from one month to ten months previously, showed strong symptoms of sensitization which caused the death of two goats and made three others extremely ill.

Some four months later pulpy kidney serum was again given to another group of five goats and goatlings but in a reduced dose of 5 c.c. The first two inoculated showed no reaction so, considering this dose to be safe, three others were done. Within two hours two of these animals were in a state of collapse and the third aborted her kids three days later.

I wrote to Dr. R. F. Montgomerie on the subject but unfortunately he could suggest no very satisfactory method of overcoming the difficulty.

The proposition is made all the more obscure when one considers that the test goats were inoculated frequently without ill-effects, a study of the graphs for weight and milk yield showing an almost immediate response.

I any member can throw any light on the matter or can offer any suggestions as regards subsequent treatment it would be greatly appreciated.

Yours faithfully,
W. B. Quarmby.

The Veterinary Hospital,
Peel Place,
North Bar Without,
Beverley, E. Yorks.
April 1st, 1947.

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MALIGNANT TUMOURS—A REQUEST

Sir,—I venture to enlist the aid of your columns in seeking to obtain the co-operation of veterinary practitioners in enabling me to secure specimens of malignant cancer from dogs, cats, etc., but more particularly canine tumours.

As a worker in the Laboratories of the National Coal Board at Crigglestone I have, naturally, a special interest in cancer research, and these specimens are sought in the prosecution of an enquiry into the "virus theory" of cancer. A response from some of your readers will be of much value and greatly appreciated.

Yours faithfully,
H. A. H. McKee.

Grosvenor House,
Carleton Road,
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Yorkshire.